

Remarks

This Supplemental Amendment is further to the Amendment and Response filed on April 28, 2008. Applicants have now amended claims 1, 7 and 59 and added claims 65-74. Applicants respectfully request the allowance of claims 1-21 and 59-74.

Substance of the Examiner Interview

The undersigned attorney and inventor Brian Moeckly wish to thank Examiner Wartalowicz for the telephone interview on June 25, 2008. Examiner Wartalowicz, Mr. Moeckly and Mr. Wu were present at the interview.

During the interview, the *Hunt* (1993) reference (Hunt, B. *et al.*, "High Temperature Superconductor Weak Links", *Second Symposium on Low Temperature Electronics and High Temperature Superconductivity*, Electrochemical Society Meeting, Honolulu, Hawaii, Vol. 93-22, p. 467-472 (May 1993)) and the obviousness rejections were discussed. Specifically, the undersigned attorney alerted the Examiner to an inadvertently erroneous characterization of the *Hunt* reference in the April 28, 2008, filing and urged the Examiner not to rely on that characterization. The undersigned attorney further stated that the *Hunt* reference did appear to disclose an ion damaged superconductor layer as a barrier between two superconductor electrodes and discussed the relevance of the *Hunt* reference.

Nature of proposed claim amendment was discussed. The Examiner indicated that claims directed to separate R_n and/or I_c could be added if adequately supported. The Examiner further indicated that claims could be amended to include the feature of uniform barrier layer.

Priority Date of the Currently Examined Subject Matter

Applicants respectfully draw the Examiner's attention to the priority date of the subject matter currently under examination. The subject matter currently under examination is disclosed in the continuation-in-part parent U.S. application 10/704,215, filed on Nov. 16, 2003, which is a continuation of U.S. application 09/082,486, filed on May 20, 1998, which claims the benefit of the U.S. provisional application 60/047,555, filed on May 22, 1997. As discussed in the Amendment and Response filed on April 28, 2008, several of the referenced cited by the Examiner are dated later than at least the

provisional application 60/047,555 and are therefore not available as prior art to reject the relevant claims.

Claim Amendment and Addition

Applicant has now amended claims 1 and 59 to recite a “substantially uniform” ion modified barrier layer. The support for this feature can be found at least at page 11, lines 21-23, and page 13, lines 24-26. This feature is not disclosed or suggested in any cited references, including the *Hunt* reference and *Harada* (“Fabrication of all-high-T_c Josephson junction using as-grown YBa₂Cu₃O_x thin films,” *Jap. J. Appl. Phys.*, vol. 30, pp. L1387-89 (1991)).

Claim 7 was amended to eliminate its multi-dependency.

New claims 65-74 have been added to recite R_nA and J_c values of the claimed devices. The support for the amendments can be found at least at page 13, lines 4-18, and Figure 6 in the drawings. These values are not disclosed or suggested in the cited references relating to Josephson junctions with ion-damaged barriers. *Hunt*, for example, discloses an R_nA value of only $5 \times 10^{-10} \Omega\text{-cm}^2$ for junctions made of ion-damaged layer. *See, Hunt* at page 007. As discussed at least at page 4, lines 25-29 of the Specification, junctions with low R_nA values imply high J_c values for usefully high I_cR_n products, and the J_c in relevant prior art devices is typically too high for applications such as single flux quantum (SFQ) logic devices. For example, *Hunt* discloses a J_c of $5.5 \times 10^6 \text{ A/cm}^2$ and states that a “potential problem is that the device current densities are approaching the electrode J_c values.” *See, Hunt* at page 006. That is, J_c values are too high, and the junction is not a weak link at all. In contrast, the claimed devices possess high R_nA values and correspondingly low J_c values, such as $5 \times 10^6 \text{ A/cm}^2$ or lower.

Applicants therefore respectfully submit that the claims are patentable over the cited prior art.

SUMMARY

In view of the above amendments and remarks, Applicant respectfully requests a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.



Respectfully submitted,

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